WHAT IS CLAIMED IS:

1   1. A method for optimizing a supply to meet a demand comprising the steps of:

2   determining a parts demand;

3   determining a machine supply;

4   maintaining a database of machine supply information, the machine supply

5   information including, for each of a plurality of machine types, a number of machines of

6   said machine type in the machine supply, a set of part types in said machine type, a

7   corresponding monetary value for each part type, and a number of each part type in said

8   machine type;

9   configuring an optimal dismantling configuration of the machine supply to meet

10   the parts demand as a function of the machine supply information.

1   2. The method of claim 1 further comprising determining at least a portion of the parts

2   demand that cannot be satisfied from the machine supply.

1   3. The method of claim 1 wherein the determining a parts demand step further

2   comprises determining an internal demand and an external demand.

1   4. The method of claim 1 further comprising determining at least a portion of the

2   machine supply that is not economically justified for dismantling.

1   5. The method of claim 4 wherein the determining at least a portion of the machine

2   supply that is not economically justified for dismantling further comprises determining

3   whether parts profit of a particular machine type is a predetermined percentage greater

4   than machine profit of a particular machine type.

1   6. The method of claim 5 further comprising determining parts profit by adding an
2   average machine net investment book value to a total parts de-manufacturing expense to
3   produce a sum, and subtracting the sum from a total valued parts with external demands
4   average fair market value.

1   7. The method of claim 5 further comprising determining machine profit by adding the
2   average net investment book value of the particular machine type to a total
3   re-manufacturing expense for the particular machine type to produce a sum, and
4   subtracting the sum from an average fair market value for the particular machine type.

1   8. The method of claim 4 wherein the determining at least a portion of the machine
2   supply that is not economically justified for dismantling further comprises determining
3   whether parts profit of a particular machine is greater than machine profit of the particular
4   machine.

1   9. The method of claim 8 wherein the parts profit is determined by adding a machine
2   average net investment book value to a total parts de-manufacturing expense to produce a
3   sum, and subtracting the sum from a book value, the book value equal to the total parts
4   with internal demands average net investment book value with a cost adjustment to the
5   net investment book value.

1   10. The method of claim 8 wherein the machine profit is determined by adding the
2   particular machine type average net investment book value to a total machine
3   re-manufacturing expense to produce a sum, and subtracting the sum from an average fair
4   market value of the particular machine type model.

1   11. The method of claim 1 further comprising :

25

2   determining a corresponding parts supply from the machine supply; and,

3   matching the corresponding parts supply to the parts demand.

1 12. The method of claim 11 wherein the determining a corresponding parts supply

2 further comprises the steps of:

3   determining the part types in a particular machine type;

4   determining the number of each of the part types in a particular machine type;

5 and,

6   multiplying the number of each of the part types in a particular machine type by

7 the number of machines for the particular machine type in the machine supply.

1 13. The method of claim 11 further comprising:

2   generating a covered parts list and a not-covered parts list if the part supply is

3 less than the parts demand; and,

4   wherein the configuring step comprises:

5   determining the optimal dismantling configuration of the machines in the

6   covered parts list; and,

7   determining the optimal dismantling configuration of machines to harvest

8   from the not-covered list.

1 14. The method of claim 13 wherein the covered parts list is divided into an internal and

2 an external list.

1 15. The method of claim 1 wherein the optimal dismantling configuration is determined

2 by linear programming.

1 16. The method of claim 1 wherein the optimal dismantling configuration is determined

2   by maximizing a summation formula for revenue considering a number of factors for a

3   part j and a machine i.

1   17. The method of claim 16 wherein the factors are:

2   revenue from parts j sales (RV_j);

3   net investment cost of machine (TC_i);

4   processing cost of de-manufacturing machine i (PC_i);

5   total supply of machine i (S_i) ;

6   netted demand of part j (D_j);

7   parts not utilized (W_{ij});

8   parts fulfillment (X_{ij});

9   machines required to fulfill the desired parts (Y_i).

1   18. The method of claim 17 wherein the summation formula is:

$$\sum_i \sum_j (RV_j \bullet \{X_{ij}\}) - \sum_i (TC_i \bullet \{Y_i\}) - \sum_i (PC_i \bullet \{Y_i\})$$

2

1   19. The method of claim 1 wherein the machine supply information further comprises

2   the number of parts for each of the part types in each of the machine types.

1   20. The method of claim 1 wherein the machine supply information further comprises a

2   forecast of machines expected to be available at a predetermined time.

1   21. The method of claim 1 wherein the machine supply information further comprises an

2   estimated number of parts for each of the part types in each of the machine types.

1   22. The method of claim 1 wherein the machine supply information further comprises

27

2   fair market value of the part types and fair market value of the machine types.

1   23. The method of claim 1 wherein the machine supply information further comprises

2   costs of de-manufacturing a specific machine type.

1   24. The method of claim 1 wherein the machine supply information further comprises

2   data on the quality of parts yielded from de-manufacturing a specific machine type.

1   25. The method of claim 1 wherein the machine supply information further comprises

2   codes for options on each of the machine types.

1   26. The method of claim 1 wherein the machine supply information further comprises

2   quality of each of the machine types.

1   27. The method of claim 1 wherein the machine supply information further comprises

2   times for demanufacturing cycles of a particular machine type.

1   28. The method of claim 1 wherein the machine supply information further comprises

2   times for refurbishing cycles of a particular machine type.

1   29. The method of claim 1 wherein the machine supply information further comprises

2   repair costs for each of the part types.

1   30. An economic supply optimization system comprising:

2   a processor;

3   a data storage device operably connected to the processor, the data storage device

4   providing data storage for the system;

5   a database of machine supply information on the data storage device, the machine

6   supply information including, for each of a plurality of machine types, a number of

7   machines of said machine type in the machine supply, a set of part types in said machine

8   type, a corresponding monetary value for each part type, and a number of each part type

9   in said machine type;

10   a program executable by the processor to

11   determine a parts demand;

12   determine a machine supply; and,

13   configure an optimal dismantling configuration of the machine supply to

14   meet the parts demand as a function of the machine supply information.

1   31. The system of claim 30 wherein the program is further executable to determine at

2   least a portion of the parts demand that cannot be satisfied from the machine supply.

1   32. The system of claim 30 wherein the program is further executable to determine at

2   least a portion of the machine supply that is not economically justified for dismantling.

1   33. The system of claim 32 wherein the economic justification further comprises parts

2   profit of a particular machine type being a predetermined percentage greater than machine

3   profit of a particular machine type.

1   34. The system of claim 33 wherein the parts profit is determined by adding an average

2   machine net investment book value to a total parts de-manufacturing expense to produce

3   a sum, and subtracting the sum from a total valued parts with external demands average

4   fair market value.

1   35. The system of claim 33 wherein the machine profit is determined by adding the

29

2 average net investment book value of the particular machine type to the total

3 re-manufacturing expense for the particular machine type to produce a sum, and

4 subtracting the sum from an average fair market value for the particular machine type.

1 36. The system of claim 32 wherein the economic justification further comprises parts

2 profit of a particular machine being greater than machine profit of the particular machine.

1 37. The system of claim 36 herein the parts profit is determined by adding a machine

2 average net investment book value to a total parts de-manufacturing expense to produce a

3 sum, and subtracting the sum from a book value, the book value equal to a total parts with

4 internal demands average net investment book value with a cost adjustment to the net

5 investment book value.

1 38. The system of claim 36 wherein the machine profit is determined by adding the

2 particular machine type average net investment book value to a total machine

3 re-manufacturing expense to produce a sum, and subtracting the sum from an average fair

4 market value of the particular machine type model.

1 39. The system of claim 30 wherein the program is further executable to:

2 determine a corresponding parts supply from the machine supply; and,

3 to match the corresponding part supply to the parts demand.

1 40. The system of claim 39 wherein the program is further executable to determine the

2 corresponding parts supply by:

3 determining the part types in a particular machine type;

4 determining the number of each of the part types in a particular machine type;

5 and,

30

6   multiplying the number of each of the part types in a particular machine type by

7   the number of machines for the particular machine type in the machine supply.

1   41.   The system of claim 39 wherein the program is further executable to:

2   generate a covered parts list and a not-covered parts list if the parts supply is less than the

3   parts demand, and to configure the optimal dismantling configuration by:

4   determining the optimal dismantling configuration of the machines in the covered

5   parts list; and,

6   determining the optimal dismantling configuration of machines to harvest

7   from the not-covered list.

1   42.   The system of claim 41 wherein the covered parts list is divided into an internal and

2   an external list.

1   43.   The system of claim 30 wherein the optimal dismantling configuration is determined

2   by linear programming.

1   44.   The system of claim 30 wherein the optimal dismantling configuration is determined

2   by maximizing a summation formula for revenue considering a number of factors for a

3   part j and a machine i.

1   45. The system of claim 44 wherein the factors are:

2   revenue from parts j sales (RV_j);

3   net investment cost of machine (TC_i);

4   processing cost of de-manufacturing machine i (PC_i);

5   total supply of machine i (S_i) ;

6   netted demand of part j (D_j);

31

7   parts not utilized (W_{ij});

8   parts fulfillment (X_{ij});

9   machines required to fulfill the desired parts (Y_i).

1   46. The system of claim 45 wherein the summation formula is:

$$\sum_i \sum_j (RV_j \bullet \{X_{ij}\}) - \sum_i (TC_i \bullet \{Y_i\}) - \sum_i (PC_i \bullet \{Y_i\})$$

2

1   47. The system of claim 30 wherein the machine supply information further comprises

2   the number of parts for each of the part types in each of the machine types.

1   48. The system of claim 30 wherein the machine supply information further comprises a

2   forecast of machines expected to be available at a predetermined time.

1   49. The system of claim 30 wherein the machine supply information further comprises

2   an estimated number of parts for each of the part types in each of the machine types.

1   50. The system of claim 30 wherein the machine supply information further comprises

2   fair market value of the parts and fair market value of each of the machine types.

1   51. The system of claim 30 wherein the machine supply information further comprises

2   costs of de-manufacturing a specific machine type.

1   52. The system of claim 30 wherein the machine supply information further comprises

2   data on the quality of parts yielded from de-manufacturing a specific machine type.

1   53. The system of claim 30 wherein the machine supply information further comprises

32

YOR920000681US1

2   codes for options on each of the machine types.

1   54. The system of claim 30 wherein the machine supply information further comprises

2   quality of each of the machine types.

1   55. The system of claim 30 wherein the machine supply information further comprises

2   times for demanufacturing cycles of a particular machine type.

1   56. The method of claim1 wherein the machine supply information further comprises

2   times for refurbishing cycles of a particular machine type.

1   57. The system of claim 30 wherein the machine supply information further comprises

2   cost repairs for each of the part types.

1   58. Computer executable process steps operative to control a computer, stored on a

2   computer readable medium, for determining an optimal dismantling configuration

3   comprising the steps of:

4   determine a parts demand;

5   determine a machine supply;

6   configure the optimal dismantling configuration to meet the demand with a

7   particular number and a particular type of machine from the machine supply.

1   59. The computer executable process steps of claim 58 further comprising:

2   maintaining a database of machine supply information, the machine supply

3   information including, for each of a plurality of machine types, a number of machines of

4   said machine type in the machine supply, a set of part types in said machine type, a

5   corresponding monetary value for each part type, and a number of each part type in said

6   machine type;

7   configuring an optimal dismantling configuration of the machine supply to meet

8   the parts demand as a function of the machine supply information.

1   60. The computer executable process steps of claim 58 further comprising a step to

2   determine at least a portion of the parts demand that cannot be satisfied from the machine

3   supply.

1   61. The computer executable process steps of claim 58 further comprising a step to

2   determine at least a portion of the machine supply that is not economically justified for

3   dismantling.

1   62. The computer executable process steps of claim 61 wherein the economic

2   justification further comprises parts profit of a particular machine type being a

3   predetermined percentage greater than machine profit of a particular machine type.

1   63. The computer executable process steps of claim 62 wherein the parts profit is

2   determined by adding an average machine net investment book value to a total parts

3   de-manufacturing expense to produce a sum, and subtracting the sum from a total valued

4   parts with external demands average fair market value.

1   64. The computer executable process steps of claim 62 wherein the machine profit is

2   determined by adding the average net investment book value of the particular machine

3   type to the total re-manufacturing expense for the particular machine type to produce a

4   sum, and subtracting the sum from an average fair market value for the particular

5   machine type.

34

1   65. The computer executable process steps of claim 61 wherein the economic

2   justification further comprises parts profit of a particular machine being greater than

3   machine profit of the particular machine.

1   66. The computer executable process steps of claim 65 herein the parts profit is

2   determined by adding a machine average net investment book value to a total parts

3   de-manufacturing expense to produce a sum, and subtracting the sum from a book value,

4   the book value equal to a total parts with internal demands average net investment book

5   value with a cost adjustment to the net investment book value.

1   67. The computer executable process steps of claim 65 wherein the machine profit is

2   determined by adding the particular machine type average net investment book value to a

3   total machine re-manufacturing expense to produce a sum, and subtracting the sum from

4   an average fair market value of the particular machine type model.

1   68. The computer executable process steps of claim 58 further comprising steps to:

2   determine a corresponding parts supply from the machine supply; and,

3   to match the corresponding part supply to the parts demand.

1   69. The computer executable process steps of claim 68 further comprising the step to

2   determine the corresponding parts supply by:

3   determining the part types in a particular machine type;

4   determining the number of each of the part types in a particular machine type;

5   and,

6   multiplying the number of each of the part types in a particular machine type by

7   the number of machines for the particular machine type in the machine supply.

1   70.   The computer executable process steps of claim 69 further comprising the steps to:

2   generate a covered parts list and a not-covered parts list if the parts supply is less

3   than the parts demand, and to configure the optimal dismantling configuration by:

4   determining the optimal dismantling configuration of the machines in the

5   covered parts list; and,

6   determining the optimal dismantling configuration of machines to harvest

7   from the not-covered list.

1   71.   The computer executable process steps of claim 70 wherein the covered parts list is

2   divided into an internal and an external list.

1   72.   The computer executable process steps of claim 58 wherein the optimal dismantling

2   configuration is determined by linear programming.

1   73.   The computer executable process steps of claim 58 wherein the optimal dismantling

2   configuration is determined by maximizing a summation formula for revenue considering

a number of factors for a part j and a machine i.

1   74.   The computer executable process steps of claim 73 wherein the factors are:

2   revenue from parts j sales (RV_j);

3   net investment cost of machine (TC_i);

4   processing cost of de-manufacturing machine i (PC_i);

5   total supply of machine i (S_i) ;

6   netted demand of part j (D_j);

7   parts not utilized (W_{ij});

8   parts fulfillment (X_{ij});

9   machines required to fulfill the desired parts (Y_i).

1   75. The computer executable process steps of claim 74 wherein the summation formula

2   is:

$$\sum_i \sum_j (RV_j \bullet \{X_{ij}\}) - \sum_i (TC_i \bullet \{Y_i\}) - \sum_i (PC_i \bullet \{Y_i\})$$

3

1   76. The computer executable process steps of claim 58 wherein the machine supply

2   information further comprises the number of parts for each of the part types in each of the

3   machine types.

1   77. The computer executable process steps of claim 58 wherein the machine supply

2   information further comprises a forecast of machines expected to be available at a

3   predetermined time.

1   78. The computer executable process steps of claim 58 wherein the machine supply

2   information further comprises an estimated number of parts for each of the part types in

3   each of the machine types.

1   79. The computer executable process steps of claim 58 wherein the machine supply

2   information further comprises fair market value of the part types and fair market value of

3   the machine types.

1   80. The computer executable process steps of claim 58 wherein the machine supply

2   information further comprises costs of de-manufacturing a specific machine type.

1   81. The computer executable process steps of claim 58 wherein the machine supply

2   information further comprises data on the quality of parts yielded from de-manufacturing

YOR920000681US1

3   a specific machine type.

1   82.   The computer executable process steps of claim 58 wherein the machine supply

2   information further comprises codes for options on each of the machine types.

1   83.   The computer executable process steps of claim 58 wherein the machine supply

2   information further comprises quality of each of the machine types.

1   84.   The computer executable process steps of claim 58 wherein the machine supply

2   information further comprises times for demanufacturing cycles of a particular machine

3   type.

1   85.   The method of claim 1 wherein the machine supply information further comprises

2   times for refurbishing cycles of a particular machine type.

1   86.   The computer executable process steps of claim 58 wherein the machine supply

2   information further comprises cost repairs for each of the part types.